UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF BOTANY AND PLANT BIOTECHNOLOGY

DEPARTEMENT PLANTKUNDE EN PLANTBIOTEGNOLOGIE

MODULE	**BOT2A10**
	PLANT ANATOMY AND CYTOLOGY
CAMPUS	**APK**
EXAM	**JUNE 2014**

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INTERNAL MODERATOR	**Mr M Fourie**

DURATION **2 HOURS** **MARKS:** **100**

NUMBER OF PAGES: **4 PAGES**

INSTRUCTIONS: **ANSWER ALL THE QUESTIONS** **(10 QUESTIONS)**

REQUIREMENTS: **EXAM BOOK**

Question 1

1.1. Study diagrams (a) – (d) representing various seeds. For each of these diagrams, write down the number of the label line pointing to:

1.1.1. The cotyledon(s); and
1.1.2. The endosperm, if present (8)

1.2. Describe the formation of microspores and the development that takes place in the microsporangia. Mention also the two possible ways in which the developing microspores may be nourished. (5)

1.3. What is double fertilization and what is its significance? (4)

1.4. Describe the anatomy of the style. Explain how it is suited to performing its function. (5)

1.5. Name the three types of endosperm development in angiosperms. (3)

[25]

Question 2

2. Study the micrograph (Figure 1) of a portion of two cells.
   2.1. Which specific type of microscope was used to take this photo? Motivate your answer. (2)
   2.2. Identify each of the following numbers as specifically as possible:

   1, 4, 8, 10 and 12.

   (5)

   2.3. What is the main function of:

   9 and 11?

   (2)

[9]

Question 3

Make a suitable slide of a portion of the fresh material. Identify a secretory structure and draw a labelled diagram of it to show the structure as accurately as possible. Show it to the lecturer. If you are unable to identify a secretory structure you may ask for one to be pointed out to you so that you may answer the rest of the question but you will forfeit two marks. (4)

Question 4

Describe the function, structure and formation of plasmodesmata. (7)

Question 5

Study slide 48.1 of a T.S. of a leaf.

5.1. Explain three different ways in which it is adapted to dry conditions. (6)

5.2. Identify any ergastic substance that is visible. Draw a labelled diagram of it. (2)

5.3. Explain whether this is likely to be a sun or shade leaf. (2)

[10]

Question 6

Study the diagram which represents a portion of a transverse (cross) section through a stem.

For 6.1 – 6.7, write down only the number which represents each of the following parts:

6.1. The vascular cambium
6.2. The first-formed annular/growth ring
6.3. Summerwood/Late wood
6.4. Primary xylem
6.5. The youngest secondary phloem
6.6. Dilatation tissue
6.7. Phellogen (7)

6.8. Is ring porous or diffuse porous wood present in the diagram? Motivate your answer. (2)

6.9. How old is the stem? (1)

[10]

Question 7

Give the correct term for each of the following descriptions:

7.1. The wall of a fruit
7.2. The sheath which envelops the epicotyls (shoot apical meristem) of the embryo of the mealie (*Zea mays*)
7.3. The most distinctive chemical component of the exine of a pollen grain
7.4. The specialised tissue in the style through which pollen tubes grow
7.5. The stage in embryo development at which the cotyledons are initiated, giving the embryo a distinctive shape

7.6. A layer of cells situated below the epidermis in the pollen sac wall having characteristic wall thickenings

(6)

Question 8

With reference to the anatomy, explain ways in which petals may be suited to performing their function. (5)

Question 9

Describe how seeds are usually formed from the time of fertilization till maturity in dicotyledonous plants. (10)

Question 10

Study the diagram of a cell and answer the following questions:

What type of microscope was used to take this photograph? (1)

Identify “a”, “b”, “f” and “i”. (4)

How is “e” suited to performing an important function? (4)

Name one distinctive feature of a chloroplast. Are chloroplasts visible in the microphoto? (2)

How do C3 and C4 plants differ as far as chloroplasts are concerned? (3)

[14]